

## REMARKS

Claims 1 to 12, as amended, appear in this application for the Examiner's review and consideration. The amendments are intended to place the claims in better form for U.S. practice, and are fully supported by the specification and claims as originally filed. Therefore, there is no issue of new matter.

Applicant acknowledges with appreciation the indication of allowable subject matter in claims 2 to 5 and 7 to 9. Applicant respectfully submits that all the claims are in conditions for allowance for the reasons set forth below.

Claims 1, 6, and 10 to 12 stand rejected under 35 U.S.C. 102(b), as allegedly anticipated by or, in the alternative, under 35 U.S.C. § 103(a), as allegedly being unpatentable over European Patent Application No. EP 1 308 484 to Vos et al. (Vos), for the reasons set forth on pages 2 to 5; and

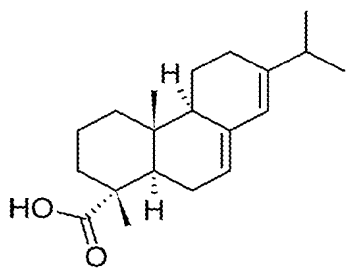
Claims 2 to 5 and 7 to 9 stand objected to, as depending upon a rejected base claim, for the reasons set forth on page 5 of the Office Action.

In response, Applicants submit that, as recited in claim 1, the presently claimed invention is directed to a silyl ester copolymer solution. The claimed silyl ester copolymer solution comprises a silyl ester copolymer having a weight-average molecular weight between 1,500 and 20,000. The silyl ester copolymer solution has a solids content of at least 55 weight percent and a viscosity of less than 20 poise at 25°C.

As recited in claim 6, the presently claimed invention is directed to an antifouling coating composition. The claimed antifouling coating composition comprises a silyl ester copolymer and an ingredient having biocidal properties for aquatic organisms. The composition has a VOC below 400 grams per liter and a viscosity of less than 20 poise at 25°C.

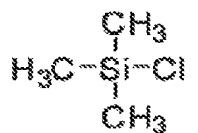
In contrast to the presently claimed silyl ester copolymer solution, Vos discloses silyl esters of rosin as a binder component in self-polishing antifouling paints. *See Vos*, Abstract and paragraph [0014]. Vos discloses that the "ablative" effect of antifouling paints based on rosin or rosin metal salts is largely overcome by using silyl esters of rosin, which are also known as silylated resins and silyl abietates. *See Vos*, paragraph [0013]. As is well known in the art, silyl abietates are silyl esters of abietic acid. Vos discloses that rosin has a low molecular weight, and that about 80 percent of rosin is abietic acid, which is also known as sylvic acid. Vos then teaches that abietic acid can be used instead of rosin. *See Vos*, paragraphs [0008] and [0018].

Thus, Vos discloses the use of silyl esters of rosin in self-polishing antifouling paints, where the rosin is about 80 percent abietic acid. As is well known in the art, abietic acid has the structural formula



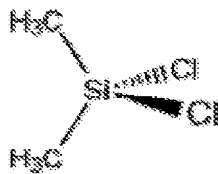
the molecular formula  $C_{20}H_{30}O_2$ , and a molecular weight of only about 302. Clearly, abietic acid is not a polymer.

As stated in the Office Action at page 2, paragraph 2, Vos discloses the preparation of silyl esters in Examples 1 and 2. In example 1, the silyl esters are prepared from Portuguese gum rosin and trimethylsilyl chloride. As noted above, Vos discloses that rosin is primarily abietic acid. As is known in the art, the trimethylsilyl chloride used in Example 1 of Vos has the structural formula



Those skilled in the art will understand that when abietic acid and trimethylsilyl chloride react, a trimethylsilyl ester of abietic acid is formed. Those skilled in the art will clearly understand that the trimethylsilyl ester of abietic acid and, thus, of gum rosin is not a polymer. The trimethylsilyl ester of abietic acid has the molecular formula  $C_{23}H_{38}SiO_2$ , and has a molecular weight of only about 374.

Similarly, in Example 2, Vos discloses the preparation of silyl esters from Portuguese gum rosin and dimethyldichlorosilane. Dimethyldichlorosilane has the structural formula



Those skilled in the art will understand that when abietic acid and dimethyldichlorosilane react, the dimethyldichlorosilane will form an ester with each of two abietic acid molecules. The resulting molecule silyl ester compound will be expected to have the molecular formula  $C_{43}H_{67}SiO_4$  and a molecular weight of about 675.

Therefore, the silyl esters of rosin disclosed by Vos are not polymers, and, in particular, are not the silyl ester copolymer of the presently claimed silyl ester copolymer solution and antifouling coating composition recited in claims 1 and 6, respectively. Vos discloses silyl esters of rosins that have molecular weights significantly less than the presently claimed weight-average molecular weight of between 1,500 and 20,000 recited in claim 1. Where the rosin is primarily abietic acid, as disclosed by Vos, the molecular weight of the disclosed esters will be about 374 to 660. Thus, the presently claimed silyl ester copolymers are not disclosed by Vos, and the properties of those copolymers, such as the claimed weight-average molecular weight between 1,500 and 20,000, are not inherent to the silyl esters produced in Examples 1 and 2 that are disclosed by Vos.

Although Vos discloses a “polymerised rosin” as a rosin in paragraph [0020], a “polymerised rosin” is known in the art to be a rosin oligomer, rather than a true polymer, made up primarily of rosin and rosin dimers, with only a small amount of trimers, as the main components. For example, see the attached Product Data Sheet for the Poly-Pale material listed in Table 1 on page 4 of Vos. The Product Data Sheet discloses that the weight average molecular weight of Poly-Pale is 353, indicating an average degree of polymerization of less than 2. The silyl esters of such polymerized rosins are not silyl ester copolymers in accordance with the claims of the present application.

Applicant submits that the presently claimed invention provides a silyl ester copolymer solution that allows the preparation of an antifouling coating that has a volatile organic compound (VOC) of less than 400 grams per liter, but is still applicable by airless spray, brush roller, and other common application methods. The presently claimed silyl ester copolymer solution possesses the coating properties, such as hardness and high integrity, required for an antifouling coating. *See* the present specification, page 4, lines 7 to 16, and page 4, line 26, to page 5, line 3.

As recited in claim 1, such a silyl ester copolymer solution is provided by a silyl ester copolymer solution having a solids content of at least 55 weight percent, a viscosity of less than 20 poise, and a weight average molecular weight between 1,500 and 20,000. The use of a silyl ester having a weight-average molecular weight between 1,500 and 20,000 provides a composition having a VOC of less than 400 grams per liter and a viscosity of less than 20 poise. The molecular weight of the copolymer provides a solution that is neither disclosed nor suggested by Vos. Vos does not disclose silyl ester copolymers, and the silyl esters disclosed by Vos have molecular weights significantly less than those recited in the present claims.

Finally, the International Report on Patentability, which is of record for the present application, found that all claims of the international application are novel and inventive over the cited prior art including Vos. The report concluded that the silyl esters of rosin disclosed by Vos are not silyl ester copolymers, and do not have a weight average molecular weight between 1,500 and 20,000, as presently claimed. Vos does not disclose or suggest the silyl ester copolymer solutions and antifouling coating compositions of the presently claimed invention, and provides no reason for one of ordinary skill in the art to do so. One of ordinary skill in the art following the disclosure of Vos would not obtain the silyl ester copolymer of the presently claimed invention.

Therefore, as Vos does not disclose or suggest the presently claimed invention, and provides no reason for one of ordinary skill in the art to obtain the presently claimed invention, the present claims are not anticipated by or obvious over Vos. Accordingly, it is respectfully requested that the Examiner withdraw the rejections of claims 1, 6, and 10 to 12 under 35 U.S.C. §§ 102(b) and 013(a) over Vos.

With regard to the objection to claims 2 to 5 and 7 to 9, as the claims from which claims 2 to 5 and 7 to 9 depend are patentable for the reasons set forth above, Applicant respectfully requests the Examiner withdraw the objection to claims 2 to 5 and 7 to 9.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

No fee is believed to be due for the filing of this Amendment. Should any fees be due, however, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,

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Dated: July 1, 2009

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